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## SAMPLING & VALIDATION METHODOLOGY

### Introduction

Bangor Hydro-Electric Company will be implementing three new load studies by March 1, 1999. The load data from these samples will be used to build a library of daily load profiles for broadly defined Residential, Small Commercial, and Large Commercial/Small Industrial customer classes. These profiles, in turn, will be used to estimate the hourly loads of all Competitive or Standard Offer Energy Providers operating in Bangor Hydro's service territory. The estimated Provider loads will then be supplied to ISO-NE for use in the financial settlement process between ISO-NE and the Providers.

### Population

Every customer taking electrical service within Bangor Hydro's territory will be placed in one of three groups. Actual daily loads will be collected for those (1) telemetered. The hourly loads of the remaining customers will be estimated using profiles either developed from (2) samples or from (3) engineering estimates. Addendum A shows the profiled, deemed, and mandatory telemetered groups and the rate classes which they will represent.

#### Profiled Groups

Residential - all rate classes meeting the usage characteristics of a residential customer as described in the Company's rate book.

Small Commercial - non-residential customers taking service at or below a demand of 25 kW.

Large Commercial/Small Industrial - a non-residential customer taking service at a demand in excess of 25 kW, but who does not meet the threshold for mandatory telemetering.

#### Deemed Profile Group

A Deemed Profile service will be any service with a consistent and predictable usage pattern. The various lighting classes are examples of such a predictable pattern. Lighting load is generally identifiable because of its rate class designation. Other candidates for deemed profiles, such as cable TV repeaters, are not so separately identified, but are usually found within the General Service class. Where possible, such consistent loads will be identified either via SIC codes or block billed status and separated out from the Small Commercial profiled group.

#### Telemetered Group

A Telemetered customer will be any customer whose actual daily hourly loads are collected at the end of each day via remote interrogation of that customer's meter. Any customer with demands in excess of 500 kW or who is a member of a class where the monthly minimum billed demand is 500 kW or more will be telemetered, as mandated in the Load Profiling order issued by the MPUC on October 13, 1998. Any other customer can be telemetered at the option of the customer's energy supplier. The cost of optional telemetering would be borne by the energy supplier.

### Sampling for Profiled Groups

Samples, stratified by usage, will be drawn from the combined rate classes that will make up the three profiled groups. Standard load research sampling methodology, as outlined in the AEIC's Load Research Manual, will be employed to determine overall sample sizes; number of strata; breakpoints; and strata sizes. Centered systematic sampling will then be used to choose the actual samples. Ten alternates will be chosen for each primary point.

Other uses of the load data, such as rate design, will be supported by post stratifying the sample back into separate rate classes.

### Sampling Unit

The sampling unit will be the meter, except for those customers with separately metered hot water or heating loads. For these customers, interval data will be collected for both meters and then totalized to get the hourly loads of the entire premise.

### Sample Bias

Every effort will be made to ensure that all Bangor Hydro customers whose loads will be estimated via profiling will have an equal opportunity of inclusion in the appropriate sample. Any instance where an alternate must be chosen to replace the primary point will be documented.

### Accuracy

Samples will be designed with at least a 90% confidence level, with a plus or minus 10% error margin at the time of Bangor Hydro's summer system peak. The summer peak hour for Bangor Hydro occurred on the 10<sup>th</sup> of August at the hour ending at 1500 (3 p.m.).

### Sample Validation

Bangor Hydro proposes four methods of tracking sample validity.

1. As load data comes in for each sample point, validation checks will be performed to identify changes in usage patterns. If necessary, alternate points may be chosen to replace outliers.
2. Each month sample statistics such as means and standard deviations will be checked against both the original sample design and the class populations to identify differences.
3. The degree to which known loads plus losses and estimated loads plus losses either underestimate or overestimate system loads will be tracked.
4. As customers within demand classes move to telemetering, changes in the class average load factors will be tracked and reported monthly. The report will include the load factors of telemetered customers, thereby allowing a determination of the extent of "cherry-picking" occurring.

### Load Profiles

Bangor Hydro will create load profiles using ratio estimation techniques.